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## Repellents and Anti-Vector Advice for Safe Summer Fun

Summer is nearly here and with it comes many of our pests such as flies, fleas, ticks, gnats, and mosquitoes. Besides the annoyance of their buzzing around your head, or crawling on your body, there is disease to consider.

From **ticks**, we can acquire a variety of diseases; the most prominent and often difficult to treat is Lyme disease. Just the thought of these little bloodsuckers feeding on you will give most people the creeps. The **fleas** will be hatching and looking for a blood meal from you or your pet. Plague is one potential disease transmitted by fleas that you may be exposed to when camping out in our beautiful state. **Flies** are another real bothersome critter, as they go from animal waste to your hamburger, or in your face-- always willing to share any *pathogen* they may mechanically carry to you. We cannot forget the tenacious **mosquito**; these little blood suckers, with their hit and run tactics are bound to annoy most anyone. They are capable of transmitting many diseases like West Nile Virus (WNV), Malaria, Dengue Fever, Western Equine Encephalitis, St. Louis encephalitis-- well you get the picture. It is best to be prepared for them. Repellents are available, but some precautionary dressing and environmental considerations may go a long way in reducing the exposure to these potential *vectors*.

### Clothing

- Wear long pants and tuck pant legs into socks or boots; tape where pants and socks meet to keep ticks from getting under your clothing.
- Light colored clothing should be worn so you can spot fleas, ticks or mosquitoes.
- Wear long sleeved shirts; tuck in pants, and bind shirt at the wrist.

### Avoidance

- Heed posted tick warning signs when enjoying the outdoors.
- Stay on cleared trails when hiking.
- Avoid grassy, bushy overgrown areas.
- Do not sit on, sleep on or next to leaf litter, especially near rodent burrows, as these are locations where immature ticks may reside.
- Avoid areas and times you notice mosquitoes, such as dawn and dusk.
- Plan activities to avoid mosquito feeding schedules.
- Keep food items stored--and area clear of food attractants (Flies, wasps, bears, raccoons).

## **Around the home or property**

- Remove vegetation along trails and paths.
- Remove leaf litter, brush, and tall grass around homes in rural areas.
- Applications of insecticides are limited in effectiveness and duration. If pesticides are used follow label instructions-- this is the law!
- Animal reservoir control can entail excluding deer from yards, controlling rodents such as deer mice, wood rats, and gray squirrels around homes. These can be reservoirs for Lyme disease, and deer mice are potential reservoirs of Hantavirus.
- Collect and dispose of animal wastes daily. (Flies)
- Properly contain garbage. (Flies)

## **REPELLENTS**

*There are two basic types of repellents; those for skin application and those for application to clothing and other fabric materials like tents and mosquito netting.*

### **SKIN REPELLENTS:**

DEET (N, N-diethyl-m-toluamide) has been the industry standard for years but is not without problems. [1] About 50% of the topically applied DEET is absorbed through the skin into systemic circulation within six hours. Oxidative enzymes in the liver metabolize the majority and about 10% to 15% of each dose can be recovered from the urine. [2] Toxic and allergic reactions have been reported from DEET use. The chemical has been associated with bulbous eruptions (blisters) and contact urticaria (hives). [3] Toxic encephalopathy has occurred with excessive or prolonged use of DEET, particularly in infants and children. (D. Edwards and C. Johnson, Clin Pharm, 6:496, 1987)

Citronella based repellents and Avon's "Skin So Soft" offer short-term repellency for not much longer than 30 minutes. With all the stated drawbacks of DEET, it is still one of the most effective insect repellents.

3M helped to make DEET use safer and more effective by micro-encapsulation. The commercial brand *Ultrathon*<sup>™</sup> is a 24% aerosol. The *micro-encapsulation* provides for a much longer *half-life* when applied, and reduces the absorption into the lipid layer of our skin. There is also available at Army Surplus stores a military version of the 3M<sup>™</sup> *microencapsulated* DEET. This is a thick cream at a concentration of 31.58% and is effective for up to 12 hours.

A fairly new repellent product on the US market is contains *Picardin* and one commercially available product is "Cutter Advanced<sup>™</sup>" spray containing 7% picardin. A Consumer Reports study compared 7% picardin with Cutter<sup>™</sup> Unscented 10% DEET spray. Both provided effective relief from aggressive mosquitoes for 2-3 hours and up to eight hours on less aggressive mosquito species that can transmit West Nile Virus. It is good to have another alternative!

There is another promising repellent containing “oil of lemon eucalyptus” that in one study by Consumer Reports (August 2005), prevented mosquito bites from aggressive mosquitoes for 4-8 hours, and more than 12 hours for less aggressive mosquito species. The product “Repel Lemon Eucalyptus” (pmenthane 3,8-diol or PMD) spray is another product in the arsenal of mosquito repellent products

Two studies, one from Consumer Reports in 2000, and another from the New England Journal of Medicine compare repellents, and give the duration of repellency you can expect from the various products evaluated. This can be a great aide when deciding what to use, depending on how long you will be outdoors in mosquito land. If it is a short time, a product like “Skin-So-Soft” may be the product of choice, or if long-term protection is needed a product such as *Ultrathon* may be the product of choice. One thing to keep in mind is that different species of mosquitoes react differently to the various repellents, so it is always good to have a back-up product in case the mosquitoes do not mind the contact with the first line repellent you are using.

We have mostly been discussing repellents for mosquitoes, but we should not forget ticks, especially ticks that transmit Lyme disease. Last year, 2005 there were 22,471 diagnosed cases of Lyme disease in the US. California had 149 diagnosed cases of Lyme disease and so far this year we have had 65 cases. Since Lyme disease has such varied symptoms, and some people do not notice a problem at first, but develop a progression of symptoms over time, you should use caution in known tick infested areas.

Repellents used for mosquitoes can provide some protection from ticks, but there is no clear-cut efficacy. The best repellent and protection is using a permethrin type spray on your clothing.

***Always follow label directions when using repellents!***

### **CLOTHING:**

*Permethrin* is the best repellent for clothing and mosquito screen use. *DEET* can be used but has a short residual effect; permethrin lasts on clothing, tents, and mosquito screens for at least two weeks. Permethrin is an insecticide that not only repels, but also often kills pests that unwisely trespass on the treated material. Two brands of *permethrin* clothing repellents sold in our area are “Permanone”™, and “Sawyers”™-- these can be found in sporting goods stores, back packing stores, and some variety stores.

### **TICK IDENTIFICATION AND TESTING**

One of the services Alameda County Vector Control Services District (ACVCSD) provides is tick identification. This should be the first step if you find an attached tick on yourself, your children, spouse or friend. If the tick happens not to be a *Western Black-legged* tick, you will not have to worry about Lyme disease. If it happens to be a Lyme disease vectoring tick it can be tested for the Lyme disease spirochete, and if it is negative, that is good news, but if it is positive this will be a basis for a discussion with your physician relating to treatment options.